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(54) Title: CASING CENTRALISER

(57) Abstract

A casing centraliser and assembly comprising a tubular and a centraliser, the centraliser comprising a plastics material.

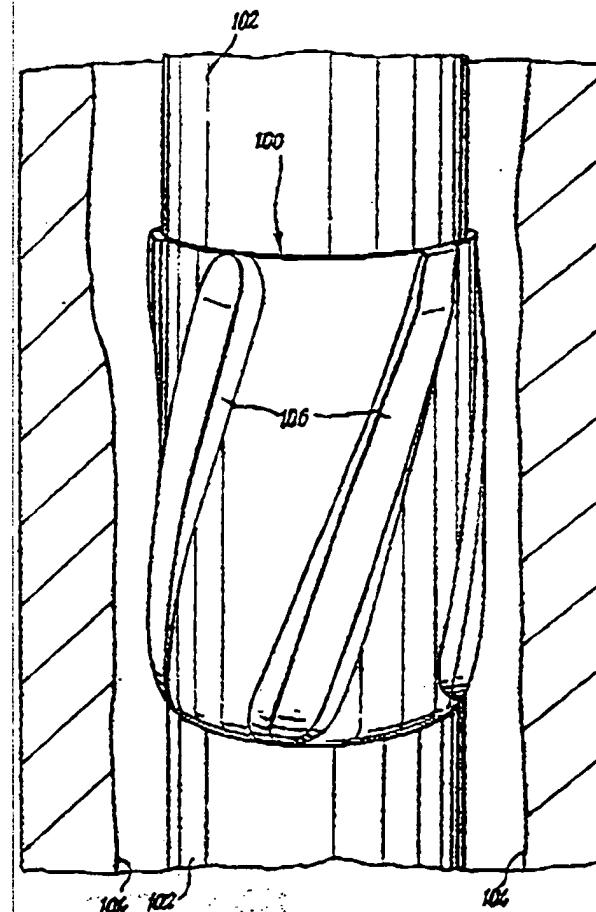
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## Published

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1        "CASING CENTRALISER"

2

3        The invention relates to a casing centraliser.

4

5        When a well has been drilled for the eventual  
6        production of hydrocarbons, one of the procedures  
7        commonly employed in readying the well for production  
8        comprises installing hollow tubular casing in the well  
9        to line the borehole. The space between the exterior  
10       of the casing and the sides of the borehole are filled  
11       with cement, which acts as a sealant and provides  
12       mechanical support for the casing. As it is desirable  
13       that the casing be centralized in the well bore when  
14       cemented, proposals have been made for providing the  
15       casing (prior to cementing) with externally mounted  
16       centralisers to hold the casing away from the well bore  
17       and towards the centre of the bore.

18

19       In accordance with the present invention, a casing  
20       centraliser comprises an annular body, a substantially  
21       cylindrical bore extending longitudinally through the  
22       body, the annular body comprising a plastic,  
23       elastomeric and/or rubber material, the bore being a

1 clearance fit around the tubular casing to be  
2 centralised by the centraliser.

3

4 In a preferred embodiment the invention provides a  
5 casing centraliser assembly comprising tubular casing  
6 and a centraliser as defined above.

7

8 Typically, the plastic, elastomeric and/or rubber  
9 material may comprise polytetrafluoroethylene (PTFE),  
10 polyetheretherketone, carbon reinforced  
11 polyetheretherketone, polyphthalamide, polyvinylidene  
12 fluoride, polyphenylylene sulphide, polyetherimide,  
13 polyethylene, polysulphone, polyethersulphone,  
14 polybutyleneterephthalate, polyetherketoneketone,  
15 polyamides, rubber & rubber compounds, phenolic resins  
16 or compounds, thermosetting plastics, thermoplastic  
17 elastomers, thermoplastic compounds or thermoplastic  
18 polyester resins.

19

20 In one example of the invention, the plastic,  
21 elastomeric or rubber material may contain a filler  
22 material, such as glass, carbon, PTFE, silicon,  
23 molybdenum disulphide, graphite, oil or wax, or any  
24 combination of these materials.

25

26 The annular body may be manufactured from and consist  
27 of the plastic, elastomeric and/or rubber material.  
28 However, the annular body may comprise a combination of  
29 the plastic, elastomeric and/or rubber material and  
30 another material such as a metal. For example, the  
31 annular body may comprise a metal skeleton or other  
32 structure coated, or partially coated, with the  
33 plastic, elastomeric or rubber material. In addition,  
34 or as an alternative, the annular body may comprise a  
35 combination of different plastic, elastomeric and/or

1 rubber materials.

2

3 Preferably the centraliser further comprises a  
4 peripheral array of a plurality of longitudinally  
5 extending blades circumferentially distributed around  
6 said body to define a flow path between each  
7 circumferentially adjacent pair of said blades, each  
8 said flow path providing a fluid flow path between  
9 longitudinally opposite ends of said centraliser, each  
10 said blade having a radially outer edge providing a  
11 well bore-contacting surface.

12

13 Said centraliser is preferably free of any means  
14 tightly gripping a casing when said centraliser is  
15 installed thereon, whereby said centraliser and said  
16 casing are mutually rotatable.

17

18 Said blades are preferably mutually substantially  
19 equidistantly distributed around said body. Said blades  
20 preferably each extend circumferentially at least  
21 part-way around said body between longitudinally  
22 opposite ends thereof to provide a circumferential  
23 distribution of each said well bore-contacting surface.  
24 Each said blade preferably has a radially inner root  
25 integral with said body, each said radially inner root  
26 preferably being circumferentially wider than the  
27 respective radially outer edge. Said blades are  
28 preferably circumferentially wider at one end of the  
29 centraliser than at the other end, said one end  
30 preferably the lower end of the centraliser in use  
31 thereof. Said centraliser preferably has five of said  
32 blades.

33

34 Longitudinally opposite ends of said blades and/or of  
35 said body may be chamfered or tapered whereby to

1 facilitate passage of said centraliser down a well  
2 bore.

3

4 Examples of a casing centraliser in accordance with the  
5 invention will now be described with reference to the  
6 accompanying drawings, in which:-

7

8 Fig. 1 is a perspective view from above and to one  
9 side of a first example of a casing centraliser;  
10 Fig. 2 is a plan view from above of the first  
11 example;  
12 Fig. 3 is an underneath view of the first example;  
13 Figs. 4 and 5 are respectively radial (plan) and  
14 circumferential (side) views of a blade forming  
15 part of the first example;  
16 Fig. 6 is a perspective view of a casing  
17 centraliser mounted on casing in a borehole.

18

19 Referring first to Figs. 1 to 3, a casing centraliser  
20 is a unitary annulus comprising a generally  
21 cylindrical body 12, and an array of five  
22 equiangularly-spaced blades 14 integrally formed with  
23 the body 12. A cylindrical bore 16 extends  
24 longitudinally and coaxially through the body 12, the  
25 bore 16 having a substantially uniform diameter  
26 dimensioned to be a clearance fit around the well bore  
27 casing (not shown in Figs. 1 to 8). Each of the blades  
28 14 (see also Figs. 4 and 5) not only extends between  
29 longitudinally opposite ends of the body 12, but also  
30 extends circumferentially part-way around the periphery  
31 of the centraliser 10. The skewing of the blade 14  
32 ensures that their respective radially outer edges 18  
33 collectively provide a circumferentially substantially  
34 uniform well bore-contacting surface for the  
35 centraliser 10, as most particularly shown in Figs. 2

1 and 3.

2

3 Each of the blades 14 has a respective radially inner  
4 root 20 integral with the body 12. In each of the  
5 blades 14, the root 20 has a greater circumferential  
6 width than the outer edge 18, ie the cross-section of  
7 each blade 14 tapers towards the well bore-contacting  
8 periphery of the centraliser 10. The individual and  
9 collective shapes of the blades 14, and of the  
10 longitudinal fluid flow passages defined between  
11 adjacent pairs of the blades 14, gives the centraliser  
12 10 improved flow characteristics and minimises the  
13 build-up of trapped solids during use of the  
14 centraliser 10.

15

16 Longitudinally opposite ends of the blades 14, and of  
17 the body 12, are chamfered to assist in movement of the  
18 centraliser 10 up/down a well bore.

19

20 Although the blades 14 are shown separately from the  
21 body 12 in Figs 4 and 5 (and while the blades 4 could  
22 be separately formed and subsequently attached to the  
23 body 12 by any suitable means) it is preferred that the  
24 entire centraliser 10 be fabricated as a one-piece  
25 article.

26

27 The centraliser 10 may be manufactured entirely from a  
28 plastics, elastomeric and/or rubber material.  
29 Alternatively, the centraliser may comprise a metal  
30 body coated, or partially coated, with a plastic,  
31 elastomeric and/or rubber material.

32

33 Examples of possible plastic, elastomeric and/or rubber  
34 materials are polytetrafluoroethylene (PTFE),  
35 polyetheretherketone, carbon reinforced

1 polyetheretherketone, polyphthalamide, polyvinylidene  
2 fluoride, polyphenylene sulphide, polyetherimide,  
3 polyethylene, polysulphone, polyethersulphone,  
4 polybutyleneterephthalate, polyetherketoneketone,  
5 polyamides, rubber & rubber compounds, phenolic resins  
6 or compounds, thermosetting plastics, thermoplastic  
7 elastomers, thermoplastic compounds or thermoplastic  
8 polyester resins.

9

10 The plastics, elastomeric and/or rubber material may  
11 contain a filler. Examples of possible fillers are  
12 glass, carbon, PTFE, silicon, molybdenum disulphide,  
13 graphite, oil or wax, or any combination of these  
14 materials.

15

16 Use of a plastic, elastomeric and/or rubber material  
17 gives a number of advantages, including:- chemical  
18 resistance, such as resistance to acid; non-sparking  
19 (ie sparks are not generated if the centraliser 10  
20 collides with steel); and, materials such as PTFE give  
21 superior bearing properties.

22

23 Since the bore 16 is a clearance fit around the casing  
24 and since the bore 16 lacks any means of tightly  
25 gripping a normally dimensioned casing, the centraliser  
26 10 can not only rotate freely around the casing but  
27 also move freely along the casing (unless and until the  
28 centraliser collides with an obstruction, for example a  
29 protruding casing joint). Thus to provide longitudinal  
30 restraint for the centraliser 10 to retain the  
31 centraliser substantially at its preferred location  
32 along the casing but without impairing the relative  
33 rotatability of centraliser and casing, use is made of  
34 a stop collar 50, as illustrated in Fig. 6.

35

1 Fig. 6 shows a modified form of casing centraliser 100,  
2 fitted around hollow tubular casing 102 which is  
3 located within a well bore 104. The modified  
4 centraliser 100 is essentially the same as the  
5 centraliser 10 described above, and differs principally  
6 in the dimensions and proportions of its blades 106.  
7 In particular, the blades 106 are circumferentially  
8 wider at the lower end of the centraliser 100 than they  
9 are at the upper end. Fig. 6 also illustrates the  
10 manner in which the centraliser will hold casing out of  
11 direct contact with the well bore and centrally within  
12 the well bore, in preparation for subsequent cementing.  
13

14 In the case of casing located within larger diameter  
15 casing, centralisers can be employed on the inner  
16 casing to hold it out of direct contact with the outer  
17 casing.

18 Advantages of the invention are that the use of a  
19 plastics, elastomeric and/or rubber material for the  
20 centraliser helps to provide chemical resistance, such  
21 as resistance to corrosion from acid. Other advantages  
22 are that the materials are generally non sparking and  
23 that certain materials, for example PTFE, have superior  
24 bearing properties.  
25

26

## 1      Claims:

2      1      A casing centraliser comprising an annular body,  
3      and a substantially cylindrical bore extending  
4      longitudinally through the body, the bore being a  
5      clearance fit around tubular casing to be centralised  
6      by the centraliser, characterised in that the annular  
7      body comprises a plastic, elastomeric and/or rubber  
8      material,

9

10     2      A casing centraliser as claimed in claim 1 wherein  
11     the plastic, elastomeric and/or rubber material  
12     comprises polytetrafluoroethylene (PTFE),  
13     polyetheretherketone, carbon reinforced  
14     polyetheretherketone, polyphthalamide, polyvinylidene  
15     fluoride, polyphenylene sulphide, polyetherimide,  
16     polyethylene, polysulphone, polyethersulphone,  
17     polybutyleneterephthalate, polyetherketoneketone,  
18     polyamides, rubber & rubber compounds, phenolic resins  
19     or compounds, thermosetting plastics, thermoplastic  
20     elastomers, thermoplastic compounds or thermoplastic  
21     polyester resins.

22

23     3      A casing centraliser as claimed in claim 1 or  
24     claim 2, wherein the plastic, elastomeric or rubber  
25     material contains a filler material.

26

27     4      A casing centraliser as claimed in claim 3 wherein  
28     the filler material comprises glass, carbon, PTFE,  
29     silicon, molybdenum disulphide, graphite, oil or wax,  
30     or any combination of these materials.

31

32     5      A casing centraliser as claimed in any preceding  
33     claim, wherein the annular body consists of the  
34     plastic, elastomeric and/or rubber material.

35

1       6     A casing centraliser as claimed in any one of  
2     claims 1-4, wherein the annular body comprises a  
3     combination of plastic, elastomeric and/or rubber  
4     material and another material.

5

6       7     A casing centraliser as claimed in claim 6,  
7     wherein the annular body comprises a metal skeleton or  
8     other structure coated, or partially coated, with  
9     plastic, elastomeric or rubber material.

10

11      8     A casing centraliser as claimed in any preceding  
12    claim, having a peripheral array of a plurality of  
13    longitudinally extending blades circumferentially  
14    distributed around the body of the centraliser to  
15    define a flow path between each circumferentially  
16    adjacent pair of said blades, each said flow path  
17    providing a fluid flow path between longitudinally  
18    opposite ends of said centraliser, each said blade  
19    having a radially outer edge providing a well bore-  
20    contacting surface.

21

22      9     A casing centraliser as claimed in claim 8,  
23    wherein the blades are mutually substantially  
24    equidistantly distributed around the body.

25

26      10    A casing centraliser as claimed in claim 8 or  
27    claim 9, wherein the blades each extend  
28    circumferentially at least part-way around said body  
29    between longitudinally opposite ends thereof to provide  
30    a circumferential distribution of each said well bore-  
31    contacting surface.

32

33      11    A casing centraliser as claimed in any of claims  
34    8-10, wherein each blade has a radially inner root  
35    integral with said body, each said radially inner root

1       preferably being circumferentially wider than the  
2       respective radially outer edge.

3

4       12   A casing centraliser as claimed in any of claims  
5       8-11, wherein the blades are preferably  
6       circumferentially wider at one end of the centraliser  
7       than at the other end, said one end preferably the  
8       lower end of the centraliser in use thereof.

9

10      13   A casing centraliser as claimed in any of claims  
11       8-12, wherein said centraliser preferably has five of  
12       said blades.

13

14      14   A casing centraliser as claimed in any of claims  
15       8-13, wherein longitudinally opposite ends of said  
16       blades and/or of said body may be chamfered or tapered  
17       to facilitate passage of said centraliser down a well  
18       bore.

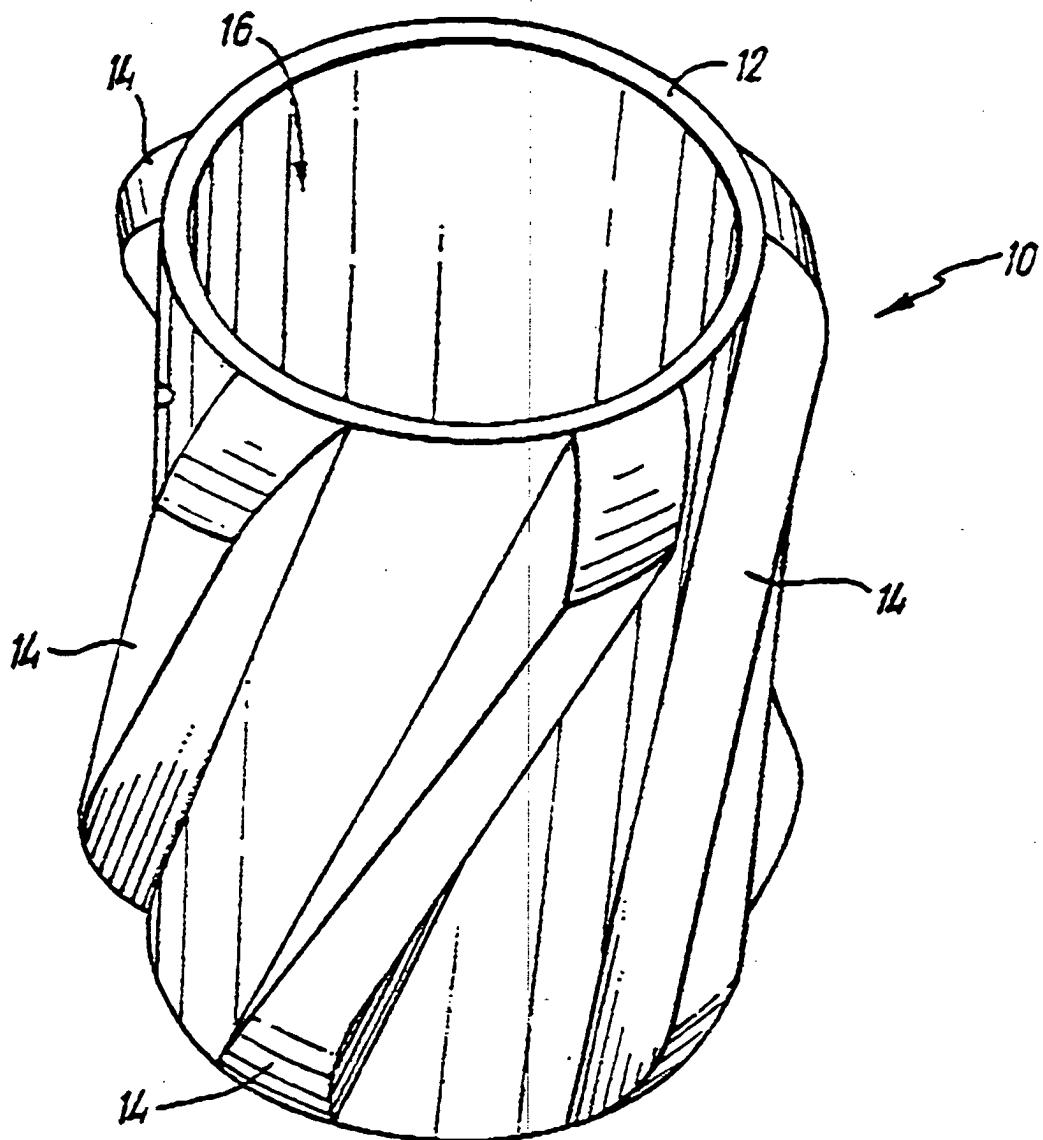
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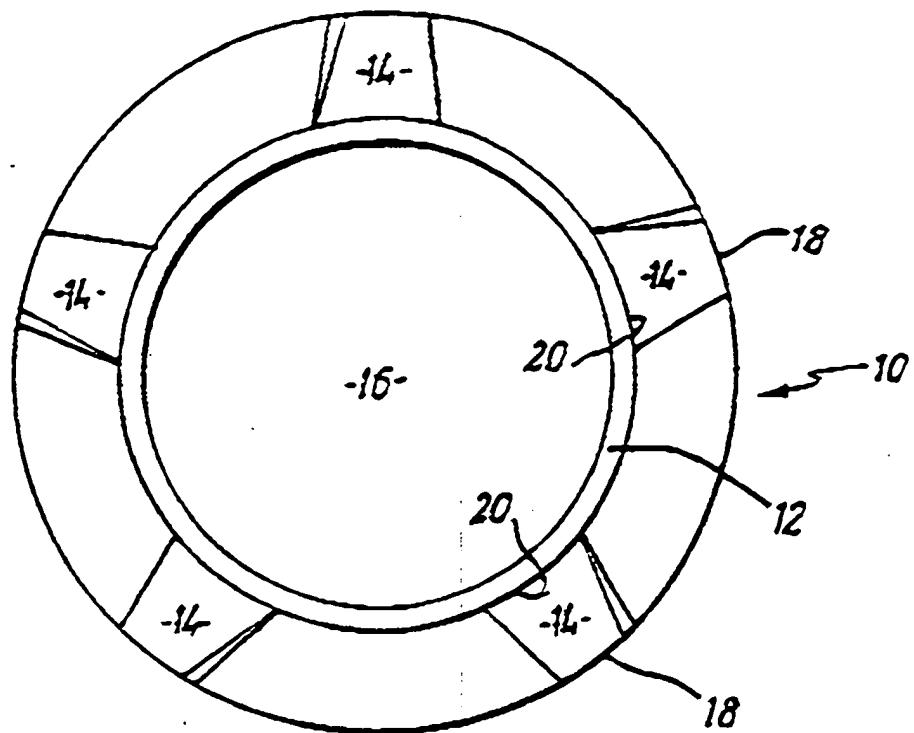
20      15   A casing centraliser as claimed in any preceding  
21       claim, substantially free of any means tightly gripping  
22       a casing when said centraliser is installed thereon,  
23       whereby said centraliser and said casing are mutually  
24       rotatable.

25

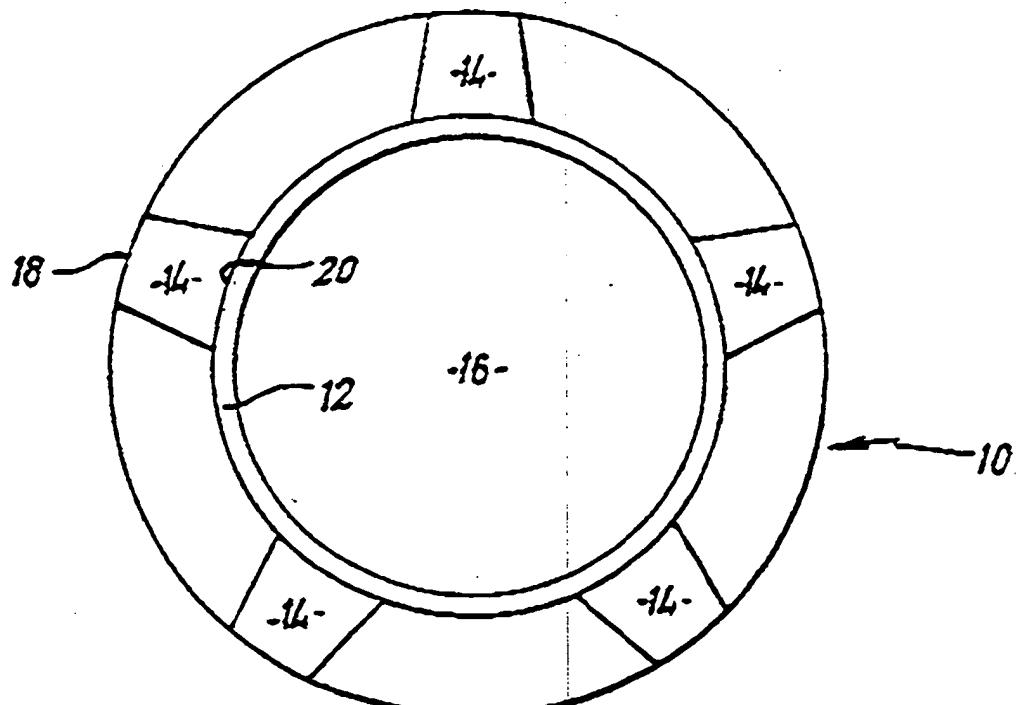
26      16   A casing centraliser assembly comprising tubular  
27       casing and a centraliser as claimed in any preceding  
28       claim.

29

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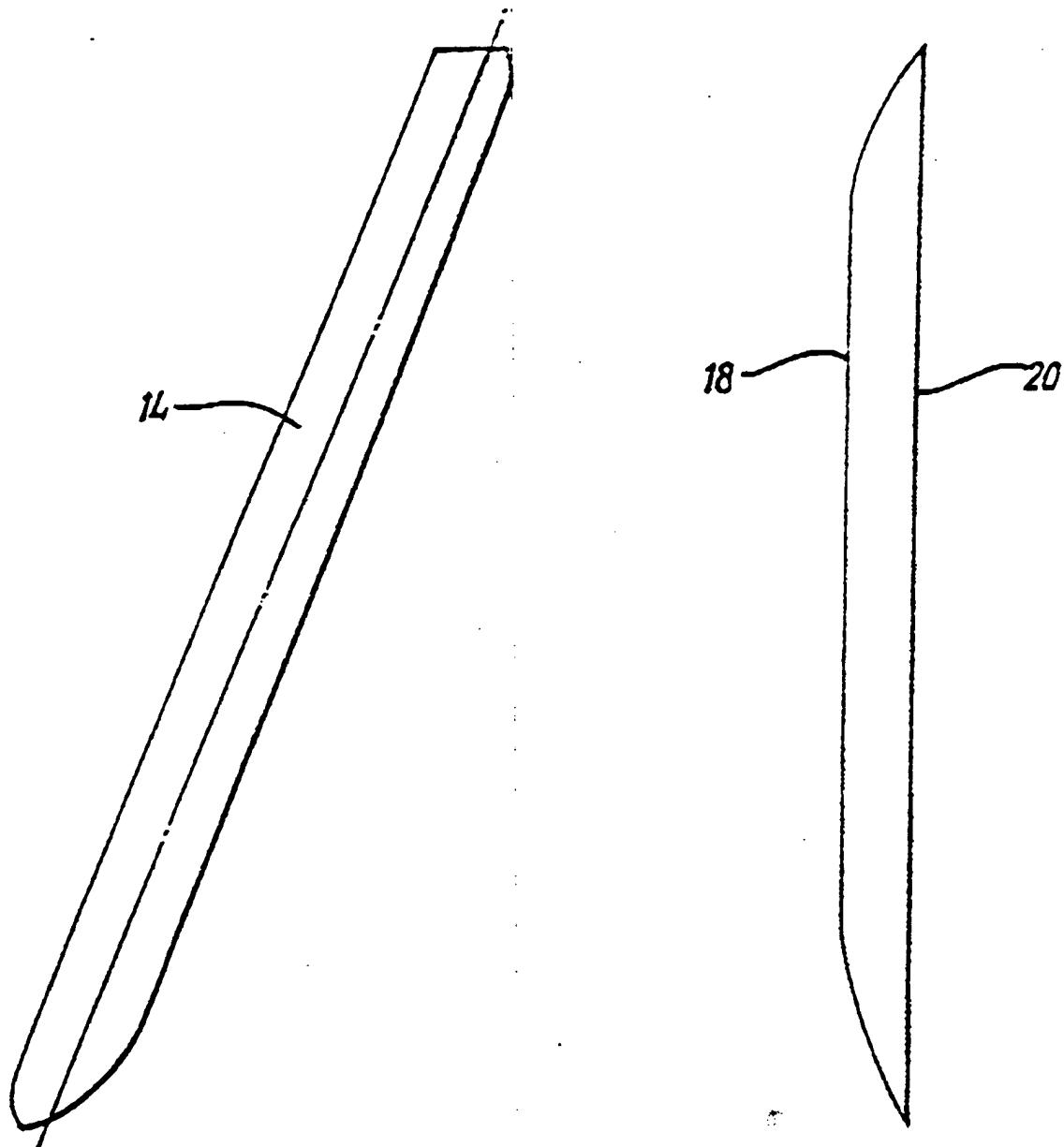


**FIE.2**

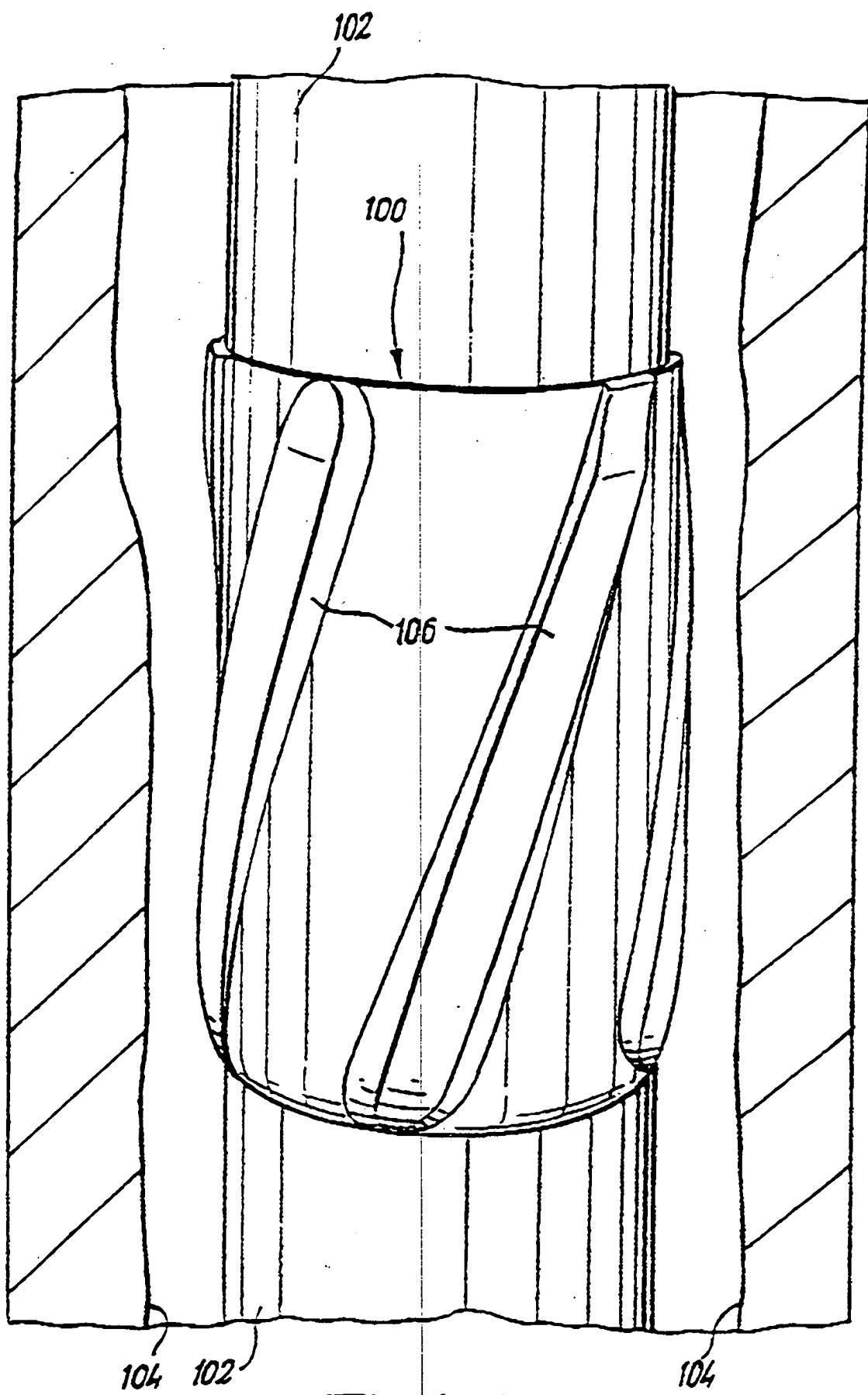


**FIE.3**

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FIG. 4FIG. 5

4/4



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Int. Application No.  
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**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC 6 E21B17/10 E21B17/22**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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X		1,2,5, 8-11, 13-16



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Patent family members are listed in annex.

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Information on patent family members

Int'l. Application No.

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